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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/629,397	07/29/2003	Michael W. Price	SP02-174	7235
22928 7590 02/08/2007 CORNING INCORPORATED SP-TI-3-1 CORNING, NY 14831			EXAMINER NGUYEN, NGOC YEN M	
			ART UNIT	PAPER NUMBER
			1754	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		02/08/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/629,397

Applicant(s)

PRICE ET AL.

Examiner

Ngoc-Yen M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 9-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) 1-8 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

DETAILED ACTION

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakuma (EP 1 026 548), optionally with of Bardsley et al ("Optical scattering in calcium fluoride crystals", Brit. J. Appl. Phys, 1965, Vol. 16, pp. 911-912) to show inherent state of fact.

Sakuma '548 discloses an optical member for photolithography comprising a calcium fluoride crystal exhibiting an internal transmittance of 99.5%/cm or greater with respect to light emitted from an F₂ laser (i.e. 157 nm) (note claims 1, 3 and paragraph [0001]).

For this rejection, the "scatter-free" is read in light of the specification as having a 157 nm transmission of >98%/cm (note paragraph [0047]), and when the calcium fluoride is "scatter-free", it has low chlorine and sulfur impurities (note paragraph [0053])

Sakuma '548 does not specifically disclose the concentration of chlorine in the calcium fluoride crystal; however, since the crystal of Sakuma '548 has a 157 nm (F₂-laser) transmission of greater than 99.5%/cm, which is higher than the 98%/cm (this is treated as "internal transmission" because of the "%/cm" unit) as disclosed in the instant specification, as being "scatter-free", the crystal of Sakuma '548 would be as "scatter-

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free when a red laser beam scatter inspection light is passed through the crystal to detect scatter" as the claimed fluoride crystal . Subsequently, since the crystal of Sakuma '548 would be "scatter-free", it would have low chlorine impurity level.

Bardsley can be applied to teach that while it is generally believed that scatter in calcium fluoride is caused by calcium oxide, chlorine and sulfur can also cause scatter. Thus, the teaching of Bardsley fairly teaches the presence of any amount of chlorine and sulfur would cause scatter. In Sakuma '548, since the calcium fluoride crystal has high internal transmission of 99.5 %/cm or greater, i.e., "scatter-free" (note reason above), the chlorine and sulfur amount in the calcium fluoride crystal of Sakuma '548 must be below the claimed amount otherwise, scattering would have occurred as taught in Bardsley.

The product of Sakuma '548 anticipates the claimed product.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma et al (EP 1 026 548) in view of Hammond et al (6,093,245).

Sakuma '548 discloses an optical member for photolithography comprising a calcium fluoride crystal exhibiting an internal transmittance of 99.5%/cm or greater with

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respect to light emitted from an F₂ laser (i.e. 157 nm) (note claims 1 and 3 and paragraph [0001]).

The difference is Sakuma '548 does not disclose the chlorine concentration in the fluoride crystal.

Hammond '245 discloses that highly pure crystal of alkali metal halide material is useful as optical elements (note column 1, lines 29-40). Hammond '245 further discloses that graphite has been used as a crucible material for growing calcium fluoride and barium fluoride. It has the desirable properties of being very resistant to corrosion by these inorganic crystal materials, being able to withstand the high temperature needed to melt the crystal material, and resulting in little contamination. Unfortunately however, graphite is porous. When it is used as a crucible material for alkali metal halide crystal growth, the melt leaks into and through the crucible, thus making such a crucible unsuitable for alkali metal halide crystal growth. In addition, surface of the graphite upon cooling, thereby preventing their ready removal from the crucible without damage to either the boule or the crucible (note column 2, lines 34-52).

Hammond '245 discloses a crucible comprising a vessel of porous carbon having a wall with a thickness, an outer surface, and an inner surface; a surface depth region of at least the inner surface being impregnated with addition carbon to close open porosity at the surface (note claim 1). The porous carbon can be graphite (note claim 2) and the addition carbon can be graphitic pyrolytic carbon (note claim 3) or glassy carbon (note claim 4). The crucible can be used for growing calcium fluoride (note column 6, lines 28-32).

Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to maximize the purity of the calcium fluoride disclosed in Sakuma '548, as suggested by Hammond '245. Also, it would have obvious to one skilled in the art to use the crucible of Hammond '245 in the process of producing the calcium fluoride of Sakuma '548 because such crucible would permit release of the cooled crystal without remelting (note abstract), since graphite was not in contact with the crystal, any chloride impurity in the graphite would not migrate to the crystal itself.

Applicant's arguments filed November 13, 2006 have been fully considered but they are not persuasive.

Applicants argue that an anticipation rejection requires that the claimed invention be clearly present in a single reference.

It should be noted that for the 102 rejection, Sakuma '548 is applied as a single reference to meet all the requirements in Applicants' claims. Bardsley is optionally relied upon only to show inherent state of fact, i.e. to show that in order for the internal transmission for 157 nm in Sakuma '548 to be high ($> 99.5\%/cm$), the chloride and sulfur impurities in the calcium fluoride of Sakuma '548 must be lower than the claimed amount because Bardsley clearly teaches that these impurities are known to cause scatter in calcium fluoride single crystal. It should be noted that the extra references in a 102 rejection are proper when they are cited to show that a characteristic not disclosed in the reference is inherent (note MPEP 2131.01).

Applicants argue that Bardsley does not disclose as to how low one must go to avoid scatter.

Bardsley, as stated above, is relied upon to show that if there are significant amount of chloride or sulfur impurities, scatter would occur for a calcium fluoride single crystal. When the calcium fluoride as disclosed in Sakuma '548 has high transmission at 157 nm, it is considered as being "scatter-free" and since it is "scatter-free", it inherently contains low amount of impurities, which can cause scatter, such as chloride and sulfur.

Applicants argue that Sakuma does not mention scatter and problems associated with it.

When the examiner has reason to believe that the functional language asserted to be critical for establishing novelty in claimed subject matter may in fact be an inherent characteristic of the prior art, the burden of proof is shifted to Applicants to prove that the subject matter shown in the prior art does not possess the characteristics relied upon. *In re Fitzgerald et al.* 205 USPQ 594. As stated in the above rejection, throughout Applicants' specification and claims, it is disclosed and claimed that when a calcium fluoride crystal is "scatter-free", it has a 157 nm transmission > 99%/cm (note for example claim 6). Thus, even though Sakuma '548 does not disclose that the calcium fluoride is scatter-free, however, because it has a 157 nm transmission > 99.5 %/cm (which meets the claimed "99%/cm), it must inherently be "scatter-free" as the claimed product.

Applicants argue that the assumption that the Sakuma crystal is scatter-free and it would have low chlorine level is invalid because the Examiner uses Applicants' own teaching against them.

It should be noted that "scatter-free" is reasonably read in light of Applicants' specification. Since Applicants fairly disclose that the claimed "scatter-free" crystal has a 157 nm transmission $> 99\%/cm$, one skilled in the art would consider any crystal that has the 157 nm transmission $> 99\%/cm$, such as the calcium fluoride crystal disclosed in Sakuma with 157 nm transmission $> 99.5\%/cm$, to be "scatter-free". If "scatter-free" is not read in light of the specification, "scatter-free" limitation is either be considered as require 100% transmission for any wavelength below 200 nm or such limitation is indefinite because it is unclear what is considered as "scatter-free". Similar reasoning is used for the chloride level especially in view of Bardsley, which teaches the correlation between "scatter" and chloride impurity in a calcium fluoride crystal.

Applicants argue that Sakuma is silent on the chloride levels of the crucibles used to prepared the crystals.

It should be noted that Applicants' claims are to a product, not to the crucibles or a process of using the crucibles to produce a calcium fluoride product.

Applicants argue that if one uses 99.9% as the internal transmittance for a 20 cm crystal, and for a crystal loosing 0.1% transmittance per centimeter, the overall internal transmittance is 98% per 20 cm, which is due to scatter losses in the crystal.

It is noted that in Applicants' claims, the transmission is required to be $\%/cm$, there is no thickness requirement for the crystal. However, by doing the same

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calculation, Applicants' claimed product requires to have a 157 nm transmission > 99%/cm, by using 99.1% as the internal transmittance for a 20 cm crystal, the claimed product would lose 0.9% transmittance per centimeter, and the overall internal transmittance is 82% per 20 cm, which would also be due to scatter losses in the crystal. Thus, if the overall internal transmittance of 82% per 20 cm for the claimed product is considered as being "scatter-free", then, the overall internal transmittance of 98% per 20 cm for the product of Sakuma '548 can definitely be considered as being "scatter-free".

Applicants argue that the 2% loss experienced by the Sakuma crystals would not occur in Applicants' crystals.

Applicants have not provided any evidence to support the above allegation. If the 157 nm transmission for the claimed product is > 99%/cm, such as 99.1%/cm, it is unclear how the claimed product does not have any scatter loss.

Applicants argue that Sakuma only discloses removing lead, water and oxygen from the calcium fluoride single crystal and Sakuma does not disclose the removal of chloride or the prevention of having chloride contaminate the crystal by diffusion from the crucible.

Granted that Sakuma does not disclose the step of removing chloride, however, as stated above, since the 157 nm transmission for the calcium fluoride crystal is high, the chloride level would inherently be low.

Applicants argue that the Examiner has admitted that Sakuma does not disclose the chlorine concentration.

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Granted that Sakuma does not expressly disclose the chlorine concentration for the calcium fluoride crystal product, however, such chlorine concentration is considered to be inherently low for the reasons stated above.

Applicants argue that the crucible as used in Hammond is purified by a known high temperature chlorine process before the coating is applied.

Granted that it is true, however, since the coating is a non-porous material, there is no contact between the crucible and the melt (note for example, column 3, lines 6-10), any chloride impurity contained in the crucible would not come in contact with the melt to cause any contamination.

Applicants argue that Hammond '245 does not mention diffusion of any materials in the crucible through the coating into the molten metal fluoride.

Again, the coating as disclosed in Hammond '245 has very low porosity level, i.e. less than 0.05% (note column 3, lines 51-53), such coating would not permit any diffusion of any materials in the crucible through the coating into the molten metal fluoride. It should also be noted that in the Tokai Carbon Co, Ltd. information sheet for Glass Carbon, the glassy carbon is a "gas impermeable" material, i.e., no gas can diffuse through such layer.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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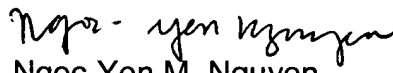
TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner can normally be reached on Part time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
February 5, 2007